MORTALITY

AND

SANITARY RECORD

OF

NEWARK, N. J.

1859-1879

(With Charts, Tables, Sanitary and Topographical Maps, Etc.)

A REPORT

PRESENTED TO THE

PRESIDENT AND DIRECTORS

OF THE

MUTUAL BENEFIT LIFE INSURANCE CO.

JANUARY, 1880.

BY

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THE MORTALITY AND SANITARY RECORD OF NEWARK

DURING THE PAST 20 YEARS.

L. C. GROVER, *President Mutual Benefit Life Insurance Company:*

SIR—In compliance with your request, and in the conviction that the large pecuniary interest of the Mutual Benefit in the City of Newark warranted inquiry into its healthfulness and rate of mortality, the following investigation has been made:

The large amount at risk on the lives of the inhabitants, added to the value of real estate, either acquired or held as security, certainly make the Company seriously interested in the city's welfare.

Not only is the actual healthfulness of the city of importance, but the *reputation* of the city as a place of residence has so decided an influence in the valuation of its real estate, that the Company can properly proclaim its interest, and if necessary demand careful attention to sanitary defects.

The city, up to a comparatively recent period, has enjoyed a reputation excelled by but few cities of the United States, and while it cannot be denied that this reputation has been impaired within a few years, it becomes a question whether this is justly due to growing sanitary evils, or is but unfairly and unwarrantably asserted.

The city is certainly healthfully situated, and possesses all the facilities for developing in the highest degree, not only the interests of its multitude of manufactories, but the domestic comfort and welfare of their owners. And while at present it is in the condition of a farmer who has wasted his energies in trying to develop too many unproductive farms to the neglect of his homestead, and has piled upon its tax-paying property the expense of misnamed improvements, for which such property is in no way remunerated, the evil is remediable, and Newark can readily be made both attractive, healthful, and wealthy.

The accompanying tables have been compiled with great care, and I am indebted not only to some of the city officials for their assistance, but to gentlemen formerly connected with the City Government, who have taken patriotic interest in the matter. The statements made have been verified, the maps have been accurately and authoritatively prepared, and it is hoped that the labor bestowed may at least indicate the direction in which improvement may be sought.

Newark has often stood near the head of the list of cities of the United States for its healthfulness, and it is important to ascertain whether there is any valid reason why it should not be placed still higher in the future.

By a list compiled from the records of the National Bureau of Health, but which it is not necessary to give because indicating the standing of cities only for the last six months of 1879, it appears that this city shows a mortality of 22.1. (It is elsewhere stated that it is, for the year 24.) The figures show improvement over the first half the year, as the total rate does over previous years.

It is but too generally conceded that the vile and ill-paved streets of the city entitle it to the full share of odium it may have or may yet receive, and few will care to dispute the fact that the "making clean the outside of the cup and platter," which is really synonymous with the so-called improvements of a few years since, has hardly done for the city what a permanent improvement of the inside would have accomplished. To make a city neat, well paved, and clean, is to bring population and health.

With reference to the prevailing views as to malarial diseases, the tables and maps presented will show some surprising features, and it is a gratifying conviction of this investigation that the whole record indicates an improvement, inadequate it is true, but as pleasing as unexpected.

As recently as 1876, but particularly in 1872, the record compared so unfavorably with other cities that it is not to be wondered at that some of its effects should have become evident ere this upon the general reputation of the city; and this is the actual fact. More than this, and singularly, the good name of the city has been injured by the tendency both on the part of laymen and physicians to ascribe every petty ailment to malaria; singularly, because even if it were true that malarial diseases unduly prevail (which is not the case), citizens would show an evident want of wisdom in spreading the impression; and as it is not and can be shown to be *not* true, the want of wisdom in indorsing it is equally suicidal.

The table marked "O" may appear to contradict this assertion, but it will be observed that the diseases there referred to are the most prevalent of the *preventable*, and not of all diseases.

Newark, even at its worst (see table "C"), has rarely attained the mortality of the City of New York, and its averages by months have invariably for the same years been below.

Still, at the beginning of this investigation, and influenced by occasional weekly reports, and by the records up to 1876, I felt convinced that the city's mortality was so unfavorable as almost to demand the measures of reform adopted a few years ago by the latter city (New York), viz.: the formation of a Citizens' Protective Hygienic Association.

This question of malaria in Newark demands more than passing notice. Careful observation during the past year has convinced me that about eighty per cent. of so-called malarial trouble is due to the derangement of special organs, such as would occur in any locality whatever. This popular delusion regarding malaria is to some extent apparently confirmed by the favorable action of quinine, but it should be remembered that this remedy is one of the best of tonics, and by its invigorating properties often assists in restoration to health.

My convictions have, however, been amply verified by frequently avoiding not only this but other anti-malarial remedies, and by seeing the patients make an even more speedy recovery under carefully adapted medication.

To a thoughtless indorsement of this popular error is probably due the impression, in neighboring and especially eastern States, that for one to live in Newark is to become a victim to chills and fever.

One has only to look at the tables appended to see that this is a bugbear, for although it may be asserted that mortality does not indicate the existence of chills and fever, inasmuch as the latter is rarely fatal, yet it is none the less true that where malarial diseases prevail, certain forms of preventable diseases exist, by which mortality *is* markedly and invariably increased.

It is a fact, moreover, that, as in *all* cities, in certain quarters intermittent and remittent fevers occur as well as other malarial disorders of a mild type, when the alluvial soil is disturbed to a sufficient depth for

sewers and grading ; and this is to some degree in proportion to the extent of territory that has been filled in—in other words, to the extent of the made lands.

All these observations are not intended as apologies for, nor to cover up the fact, that the healthfulness of the city can be and ought to be improved.

Newark, with a population of 50,000, and Newark with 125,000, cannot be properly cared for by the same parsimonious expenditure of time or money, and it is becoming evident that money can be lavishly expended with the truest possible economy in improving the sanitary condition of the city. Table " C " will show this without comment.

It should here be clearly stated that no reflection upon the City Board of Health is intended nor is justified. No individual and certainly no corporation can expect to have its work done very long or very fully without compensation, and in the hard and thankless tasks of the Board during the history of the city since it became so large, the gentlemen of the Board have done what few private citizens would have undertaken, and merit the gratitude of the community. But the sanitary needs of a city of 125,000 inhabitants are not those of the village of Newark of twenty years ago, and the city will pay more dearly each year for the mistaken economy of its adolescence and maturity. A well equipped Sanitary Bureau is a necessity as it is a refinement and blessing of modern times, and it is but poorly to the credit of a large manufacturing city that other and smaller towns have throughout the United States availed themselves of the modern improvements for cleanliness and hygienic supervision before it.

The valuable experience of a city is made available, moreover, only when the records are kept in such a manner as to involve individual time, attention, and expense.

To put off, on an already overloaded department, work so important is to insure incompleteness, and that, in this city, it has not also involved inaccuracy has been largely due to the faithful assiduity of the City Clerk.

The bare facts of record are as accurate as one not familiar with the niceties of medical nomenclature can make them, but fall far short of the detail necessary to give them their full value.

The first series of tables gives the diseases as eliminated from the records, and as will be seen show the many inaccuracies of those who made the original returns of deaths. Charlatans and empirics of various schools are unfortunately not barred from practicing upon the public nor from handing in the resulting certificate of death.

The large number of deaths of infants make a noticeable feature of these tables. Under the head of " Nativity " the different nationalities may be compared.

As actual deaths do not represent anything without a statement of the ratio borne to the whole, the table marked " A " has been prepared and a more correct classification adopted.

The first line indicates the ratio to population ; the others, the ratio borne by deaths in the individual classes to the total deaths.

The ratio of preventable deaths is strikingly large.

The mortality among males invariably exceeds that of females, and this is due chiefly to a preponderance of deaths among boys over girls.

Mortality Statistics of Newark

FROM 1859 TO 1879

(OMITTING YEARS 1862, 1865, and 1868).

NOTE 1.—In computing these tables it has been impossible to correct the inaccuracies of nomenclature found in the original records. As much has been done, however, as was practicable without vitiating the results.

NOTE 2.—The tables include some deaths from out of the city for which burial permits were issued. An estimate made by counting for several years shows that these deaths have varied from 5 to 10 per cent. of the total number. This would create an error of 1 or 1⁵ on the ratios calculated according to population. The most of the ratios, however, calculated according to total number of deaths, would not be materially affected.

NOTE 3.—For the missing years, 1862, 1865 and 1868, it has been found impossible to obtain sufficiently accurate and complete records.

	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.
Nativity.								
United States	1,324	1,740	1,372	....	1,523	1,542	....	1,708
Ireland	148	182	185	....	168	236	....	259
England	33	35	39	....	27	37	....	53
Scotland	6	8	7	....	9	9	...	18
Italy	....	1	....	....	....	....	....	1
France	5	8	7	....	10	6	....	3
Sweden	...	....	....	....	....	1	....	....
Holland	....	3	....	....	1	2	....	....
Germany	129	125	126	....	147	149	....	194
Prussia	....	....	....	....	....	....	....	....
West Indies	....	....	....	....	1	1	....	....
Nova Scotia	....	....	....	....	...	....	....	....
Switzerland	2	2	5	....	1	4	....	5
Denmark	....	....	....	....	....	2	....	....
British Provinces	4	2	6	....	2	1	....	....
Russia	1	1	1	....	1	...	....	....
Spain	....	....	....	....	....		....	....
Unknown	46	68	45	....	62	115	....	41
Total	1,698	2,175	1,793	....	1,952	2,105	....	2,282
Age.								
One year and under	561	729	642	....	605	614	....	799
Between 1 and 2	166	271	200	....	262	242	....	252
" 2 " 5	209	363	174	....	231	232	....	188
" 5 " 10	82	148	94	....	119	137	....	103
" 20 " 30	86	71	68	....	69	99	....	92
" 30 " 40	144	158	123	....	130	164	....	175
" 40 " 50	118	128	137	....	139	168	....	159
" 50 " 60	101	75	88	....	113	130	....	126
" 60 " 70	91	91	93	....	97	91	....	125
" 70 " 80	60	64	64	....	84	89	....	122
80 " and over	39	36	63	....	52	54	....	84
Unknown	20	30	24	....	31	44	....	45
	21	11	23	....	20	41	....	12
	1,698	2,175	1,793	....	1,952	2,105	....	2,282
Unknown	....	....	....	....	....	17	....	....
Men	294	280	282	....	345	431	....	424
Boys	600	840	657	....	675	717	....	775
Women	298	324	333	....	324	355	....	437
Girls	506	731	521	....	608	585	....	646
Total	1,698	2,175	1,793	....	1,952	2,105	....	2,282
Males	894	1,120	939	....	1,020	1,148	....	1,199
Females	804	1,055	854	....	932	940	....	1,083
Unknown	....	....	....	....	....	17	....	....
Total								
Population, Holbrook's Dir. (corrected)	66,000	72,000	73,000	70,000	68,000	70,000	87,400	94,800
Ratio per 1,000	25.72	30.20	24.56	....	28.70	30.71	....	24.07
Or one to	38.8	33.10	40.7	....	34.8	33.2	....	41.54

1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.
1,586	....	1,759	1,769	1,935	2,685	2,900	2,478	2,523	2,904	2,550	2,399
240	....	222	307	330	428	371	368	320	332	331	323
58	....	51	72	74	85	73	76	74	77	79	66
8	....	8	12	18	20	22	26	25	18	22	21
1	....	1	....	....	3	1	6	2	5	3	4
6	....	10	15	12	11	11	10	8	9	9	11
1	....	....	....	....	4	....	1	....	3	2	....
....	....	3	3	....	...	....	2	.. .	2	2	2
176	....	206	281	245	501	345	357	354	311	303	290
....	....	....	....	5	4	....	3	5	4	3	4
....	...	....	1	1	3	1	....	....	1	....	....
1	....	....	...	....	....	....	....	....	....	4	3
7	....	8	5	9	7	6	10	10	6	7	6
....	....	....	...	....	....	....	2	....	....	2	3
....	....	....	1	3	2	1	....	1	1	1	1
....	....	....	....	2	1	....	....	....	1	1	2
....	....	....	....	....	...	....	....	....	....	....	....
40	....	8	3	1	6	4	5	9	17	9	6
2,124	....	2,276	2,469	2,635	3,760	3,735	3,344	3,331	3,691	3,328	3,141
758	....	758	888	939	1,208	1,151	1,023	971	1,041	863	888
197	....	263	273	173	452	346	302	263	312	251	235
169	....	194	164	175	349	394	293	355	483	431	313
77	....	100	83	83	176	233	174	256	263	252	174
97	....	98	116	135	188	183	134	158	183	155	134
156	....	153	201	208	217	286	268	210	246	234	244
157	....	165	83	198	248	267	248	234	248	232	276
134	....	144	189	203	256	237	227	218	250	245	211
122	....	115	142	151	180	205	209	220	192	217	221
124	....	152	148	158	213	178	208	201	217	191	198
76	....	80	100	127	164	163	160	158	179	182	149
41	....	44	56	61	73	64	69	67	60	72	91
17	....	10	26	24	36	28	29	20	17	3	7
2,124	....	2,276	2,469	2,635	3,760	3,735	3,344	3,331	3,691	3,328	3,141
....	....	....	....	....	....	....	....	....	....	....	....
412	....	441	461	594	796	732	751	711	735	678	682
696	....	751	809	772	1,170	1,193	951	1,052	1,155	1,044	937
432	....	431	492	542	689	698	665	612	690	691	721
584	....	653	707	727	1,105	1,112	977	956	1,111	915	801
2,124	....	2,276	2,469	2,635	3,760	3,735	3,344	3,331	3,691	3,328	3,141
1,108	....	1,192	1,270	1,366	1,966	1,925	1,702	1,763	1,890	1,722	1,619
1,016	....	1,084	1,199	1,269	1,794	1,810	1,642	1,568	1,801	1,606	1,522
....	....	....	....	....	....	....	....	....	....	....	....
101,100	105,000	105,000	105,500	110,000	115,000	118,000	120,000	123,300	123,000	122,500	124,000
21.	....	20.14	23.40	23.95	32.69	31.65	27.86	27.01	30.	27.16	25.33
47.6	....	49.65	42.	41.7	30.5	31.5	35.8	37.	33.3	36.8	39.4

Preventable

(A Table made by selection from the General Records

	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.
1. Zymotic (Totals)	199	366	213	....	243	362	....	302
2. Lung Diseases, Acute	138	173	156	....	159	146	...	208
3. Lung Diseases, Chronic	232	250	270	....	264	262	....	283
4. Throat Diseases	....	13	....	....	10	7	....	3
5. Infantile Zymotic	125	147	137	....	121	117	....	198
6. Puerperal Fever	10	13	6	....	4	13	....	4
7. Debility, Exhaustion, and Scrofulous Diseases	38	74	82	....	85	93	....	100
8. Bowel Difficulties not included in Class 1	76	118	95	....	97	114	....	112
9. Diseases of Spleen	....	1	....	....	....	....	....	....
10. Whooping Cough	9	7	7	....	16	5	....	8
Total	827	1,162	966	....	999	1,119	....	1,218

General

(See Note

	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.
Zymotic.								
Erysipelas	6	15	5	....	8	14	....	5
Chicken-pox	....	....	....	....	....	....	....	....
Cholera	1	1	....	....	....	....	....	16
Congestive Chill	....	....	....	....	....	....	....	....
Diarrhœa	22	31	27	....	42	50	...	62
Diphtheria	....	11	23	....	39	29	....	46
Dysentery	18	15	19	....	22	34	....	21
Fever—Bilious	6	2	4	....	3	6	....	6
Congestive	2	2	1	....	2	3	....	2
Continued	....	1	....	....	2	5	....	1
Scarlet	96	233	70	....	53	114	....	23
Ship and Typhus	10	12	10	....	23	19	....	23
Typhoid	34	19	30	....	43	43	....	46
Remittent	3	3	3	....	....	5	....	1
Intermittent	1	1	1	....	....	1	....	....
Yellow	....	....	....	....	....	....	....	....
Spotted	....	....	....	....	....	4	....	....
Glanders	....	....	....	....	....	....	....	....
Hydrophobia	....	....	1	....	....	....	....	....
Measles	....	15	1	....	6	6	....	10
Small-pox	....	5	17	....	....	27	....	31
Varioloid	....	....	1	....	....	2	....	9
Malarial	....	....	....	....	....	....	....	....

Diseases.

on the Plan adopted by the National Board of Health.)

1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.
205	....	283	251	288	711	846	516	554	655	543	431
169	....	182	215	230	322	296	315	322	380	240	332
292	....	306	390	369	430	445	505	419	362	405	448
9	....	4	9	4	9	10	9	13	16	11	10
163	....	207	230	202	341	257	245	209	187	111	121
4	....	8	6	4	10	16	10	19	10	4	6
117	....	104	133	116	119	81	110	212	341	409	259
112	....	112	140	133	175	165	161	112	139	124	93
1	....	....	....	....	....	....	....	....	....	2	1
9	....	23	9	1	28	8	10	10	12	2	15
1,081	....	1,229	1,383	1,347	2,145	2,124	1,881	1,870	2,102	1,851	1,716

Mortality.

1, *ante.*)

1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.
9	....	8	8	12	18	19	17	15	11	14	10
....	....	....	....	....	....	....	....	....	....	....	....
3	....	2	....	1	....	....	....	....	....	....	....
....	....	....	....	....	6	16	26	10	14	13	14
40	....	42	35	34	24	28	37	35	14	26	23
35	....	17	20	28	97	162	113	371	401	193	96
15	....	22	23	11	15	22	13	10	12	10	19
4	....	3	15	12	12	16	17	7	14	7	1
....	....	3	7	8	11	8	4	3	6	8	....
1	....	....	3	2	1	4	1	....	3	2	5
22	....	114	48	28	82	167	78	26	79	191	172
9	....	15	6	8	14	13	8	12	2	4	4
56	....	43	60	44	95	50	73	37	67	42	62
6	....	3	5	6	3	8	16	5	8	10	6
....	....	1	7	22	14	15	17	6	5	4	9
....	....	....	....	....	....	....	....	1	....	....	....
....	....	....	....	....	66	28	27	....	....	5	....
1	....	....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	3	....	....
2	....	10	9	2	8	7	13	....	4	....	9
....	....	....	4	47	169	157	37	16	4	....	....
2	....	....	1	23	66	126	19	....	8	....	....
....	....	....	....	....	....	....	....	....	....	4	1

	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.
Respiratory.								
Asthma	2	5	5	....	2	2	....	....
Bronchitis	24	20	16	....	12	12	....	26
Congestion of Lungs	34	43	26	....	58	46	....	59
Consumption and Disease of Lungs	232	250	270	....	264	262	....	283
Croup	48	54	35	....	99	82	....	77
Dropsy of Chest and Pleurisy	17	15	8	....	10	11	....	4
Inflammation of Chest and Lungs, and Pneumonia	78	105	108	....	86	86	....	121
Influenza	....	....	....	....	1	....	....	2
Laryngitis	....	4	....	....	4	1	....	....
Quinsy and Inflammation of Throat	....	9	6	....	5	6	....	1
Genito-Urinary.								
Albuminuria	1	....	1	....	2	....	....	1
Diabetes	5	2	1	....	1	....	....	....
Disease of Genital Organs	2	8	2	....	3	3	....	1
Gravel	....	....	....	....	....	....	....	....
Kidneys, Inflamed	1	3	....	....	....	3	....	3
" Disease of	1	1	3	....	1	6	....	1
Syphilis	....	..	....	....	1	2	....	....
Disease of Urinary Organs (?)	....	....	1	....	....	3	....	....
External Causes.								
Asphyxia	13	27	21	....	11	2	....	4
Burns and Scalds	12	12	12	....	7	10	....	19
Casualties	15	15	13	....	26	25	....	19
Drowned	22	10	12	....	23	18	....	17
Poisoned	2	1	....	....	....	5	....	5
Suicides	7	1	1	....	1	3	....	1
Wounds	1	....	4	....	6	2	....	5
Executions	1	1	....	....	....	....	....	....
Mothers and Infants.								
Childbirth	2	3	....	....	1	1	....	2
Puerperal Fever	10	13	6	....	4	13	....	4
Debility, Infantile	4	....	....	....	....	....	....	....
Premature and Still Births	101	121	122	...	122	110	....	225
Cholera Infantum	116	138	132	....	120	116	....	198
Sprue and Teething	5	9	5	....	1	1	....	....
Uncertain Seat, Integumentary and Miscellaneous.								
Abscess	7	5	2	....	9	3	....	4
Atrophy	20	20	16	....	8	17	....	22
Cancer	17	9	11	....	12	11	....	15
Carbuncle	1	1	1	....	1	2	....	....
Catarrh	....	2	3	....	....	3	....	1
Coma	....	....	....	....	....	....	....	....
Debility	33	62	50	....	57	68	....	70
Dropsy	30	57	58	....	48	47	....	46
Exhaustion	....	4	27	....	25	16	....	24
Fever, Inflammatory	1	....	1	....	1	1	....	3
Gangrene	....	....	....	....	....	....	....	....
Hip Disease	....	....	....	....	....	....	....	....

Mortality.

1, *ante.*)

1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.
....	....	....	....	....	....	....	....	....	....	1	5
22	....	36	45	41	59	50	70	46	88	45	79
61	....	51	62	50	78	65	50	49	44	29	32
292	....	306	390	369	430	445	505	419	362	405	448
35	....	37	49	49	42	61	40	99	82	68	64
10	....	5	3	4	4	14	15	10	4	11	6
86	....	95	108	139	185	181	195	227	248	165	215
....	....	....	....	....	....	....	....	....	....	....	1
2	....	1	3	3	7	4	5	6	4	10	7
7	....	3	6	1	2	6	4	7	12	1	2
3	....	2	1	1	. ..	2	4	1	1	7	7
3	....	....	2	....	4	1	5	2	....	2	1
2	....	1	2	1	5	3	4	16	4	3	3
....	....	....	....	....	....	1	....	...	....	...	....
2	....	....	....	1	1	....	2	4	4	5	6
10	....	12	20	16	23	23	25	34	27	35	34
1	....	1	....	1	3	1	2	1	1	1	....
2	....	2	2	10	7	5	9	4	14	1	4
8	....	11	9	7	17	19	13	21	63	74	37
10	....	8	13	13	20	15	9	16	10	10	11
11	....	25	46	52	57	51	47	33	46	33	28
29	....	20	19	25	28	33	29	23	22	16	24
3	....	2	6	5	....	2	1	4	5	7	5
1	....	6	10	6	20	12	13	16	16	11	7
9	....	6	....	1	5	2	4	9	1	1	. ..
....	....	...	....	....	1	....	....	....	....	1	....
4	....	1	6	12	4	8	6	2	2	....	1
4	....	8	6	4	10	16	10	19	10	4	6
1	....	1	1	2	....	1	4	3	2	....	....
201	....	180	214	234	228	292	218	205	205	184	181
156	...	198	225	193	336	252	237	202	180	111	121
6	....	8	4	7	5	4	4	4	5	....	....
8	....	10	5	13	8	6	7	12	7	12	8
23	....	13	20	11	19	9	12	5	6	3	4
21	....	22	20	23	31	42	46	25	48	50	70
....	....	....	....	....	....	1	....	....	1	2	5
1	....	4	....	4	6	2	3	....	. .	....	2
....	....	....	....	....	....	....	....	....	....	12	5
73	....	58	67	56	73	51	62	86	161	194	130
34	....	47	42	42	55	49	46	67	37	60	35
41	....	40	59	52	36	17	36	120	172	213	120
1	....	1	2	....	1	1	....	....	1	....	...
....	....	....	....	....	....	4	3	1	2	2	5
....	....	....	....	1	1	2	....	1	1	1	....

	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.
Uncertain Seat, Integumentary and Miscellaneous.								
Inflammation	2	5	....	....	....	3	...	46
Intemperance	1	....	1	....	1	1	....	....
Malformation	4	1	2	.. .	2	....	....	1
Malpractice	....	1	....	....	....	1	....	....
Neglect	....	1	....	....	....	1	....	....
Old Age	10	11	7	....	12	10	....	18
Rheumatism	2	....	1	....	2	1	....	....
Scrofula	5	6	5	....	1	5	....	4
Skin Disease	....	....	....	....	....	1	....	1
Spinal Disease	....	2	....	....	2	4	....	2
Tumor	3	1	3	....	1	1	....	2
Ulcer	7	10	3	....	....	3	....	2
Unknown	15	2	1	....	5	7	....	8
Sundry uncertain	....	....	1	....	3	24	....	....
Gout	1	....	...	....	...	....	....	....
Paramenia	2	....	....	....	....	....	....	....
Brain and Nervous.								
Apoplexy	32	36	31	....	34	26	....	41
Paralysis	21	17	29	....	22	16	....	38
Brain, Diseases of	10	8	8	....	10	17	....	3
" Compression	1	....	2	....	2	2	....	2
" Concussion	1	5	3	....	1	....	....	2
" Congestion	48	88	35	....	54	74	....	75
Convulsions (include Epilepsy)	145	214	168	....	200	169	....	138
Delirium Tremens	4	4	4	..	1	4	....	2
Dropsy of Head (?)	63	39	60	....	55	54	....	13
Fever, Nervous	2	4	2	....	4	1	....	...
Whooping Cough	9	7	7	....	16	5	....	8
Hysteria	....	....	....	....	....	.. .	....	....
Brain Inflammation	34	13	17	....	15	17	....	24
Insanity	2	....	1	....	1	....	....	2
Meningitis	....	19	3	....	15	30	....	59
Tetanus	1	6	8	....	9	10	....	1
Heat (Sunstroke)	....	1	1	....	3	2	....	3
Circulatory.								
Anæmia	2	10	5	....	1	....	....	1
Angina Pectoris	2	2	....	....	1	2	....	1
Aneurism	1	....	....	....	....	....	....	....
Chlorosis	....	....	....	....	....	....	....	1
Cyanosis	7	2	7	....	3	5	....	2
Heart, Disease of	28	30	17	....	33	36	....	63
" Inflammation	....	1	....	....	1	1	....	1
" Rheumatic	....	2	....	....	....	1	....	....
" Valvular	2	2	2	....	1	3	....	....
Hæmorrhage	18	9	15	....	11	23	....	13
Mortification	3	12	5	....	3	5	....	....
Pericarditis	1	....	...	....	1	2	....	4
Leucocythemia	....	....	....	....	....	....	....	....

Mortality.

1, *ante.*)

1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.
10	....	3	2	3	4	....	14	4	2	8	6
3	....	....	6	8	6	3	5	2	....	....	....
6	....	5	2	5	6	2	7	3	5	1	4
....	....	....	....	1	....	1	....	....	....	1	....
....	....	....	....	....	....	....	....	....	....	....	....
5	....	32	31	34	44	41	50	34	20	28	26
1	....	2	2	3	6	3	8	6	7	5	5
2	....	6	2	6	6	8	8	1	1	....	3
....	....	....	....	....	....	....	....	....	1	....	1
1	....	....	5	1	4	3	4	4	6	1	6
3	....	6	9	3	15	8	7	5	3	4	3
3	....	1	6	3	5	4	....	2	1	2	2
11	....	16	9	4	11	7	8	16	1	6	4
3	....	1	....	....	....	1	....	....	10	14	19
....	....	....	....	....	....	....	....	1	2	1	....
2	....	....	3	....	5	3	4	1	....	1	....
25	....	45	40	48	57	69	63	53	68	54	54
31	....	54	54	58	76	57	59	74	70	67	57
21	....	26	16	20	17	29	15	19	24	13	13
5	....	1	1	2	4	2	4	2	4	1	7
1	....	3	5	2	6	1	3	....	4	2	7
63	....	63	76	53	119	86	77	51	83	67	49
170	....	138	165	213	255	245	232	213	283	225	193
....	....	3	2	4	6	3	3	4	1	6	1
32	....	9	28	44	42	34	41	14	12	27	35
5	....	1	1	....	1	2	....	....	1	....	....
9	....	23	9	1	28	8	10	10	12	2	15
....	....	....	....	....	....	1	....	1	1	....	....
28	....	23	13	7	12	11	12	12	35	17	20
....	....	....	....	1	7	....	2	....	1	....	1
48	....	47	44	48	107	80	72	81	90	95	92
10	....	5	7	3	3	17	11	10	9	3	18
2	....	....	6	1	13	3	2	2	4	2	7
3	....	5	5	3	1	1	4	1	4	4	2
3	....	1	5	2	3	6	6	7	8	3	1
....	....	1	....	1	....	....	1	....	....	....	1
1	....	1	....	....	....	1	....	....	....	....	....
2	....	3	1	....	6	7	2	7	4	2	7
49	....	50	65	69	78	74	73	69	70	56	62
....	....	....	....	....	1	....	....	2	1	....	....
....	....	....	....	....	1	4	....	1	....	....	1
5	....	3	11	7	16	19	12	19	22	29	23
18	....	22	20	31	19	23	19	24	15	29	29
....	....	1	....	1	....	1	....	3	3	....	1
11	....	2	4	6	4	8	5	5	3	2	6
....	....	....	....	....	....	....	....	....	....	....	....

General
(See Note

	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.
Digestive.								
Bowels, Disease of	2	4	1	....	2	1	....	....
" Inflammation	39	53	22	....	29	30	....	24
Cirrhosis	2	2	....	....	4	1	....	....
Cholera Morbus	3	3	3	....	5	7	....	20
Colic	1	....	1	....	1	....	....	2
Liver Congestion	...	1	....	....	2	1	....	....
" Inflammation	2	2	6	....	2	4	....	4
Intussusception	1	....	....	....	....	1	....	1
Jaundice	2	5	1	....	1	6	....	12
Liver, Disease of	7	3	7	....	5	12	....	1
Rupture and Hernia	....	....	4	....	2	2	....	4
Stomach, Inflammation of	8	5	6	....	6	4	....	2
" Disease of	5	1	5	....	1	1	....	....
Marasmus	71	111	91	....	90	106	....	92
Spleen, Disease of	....	1	....	....	....	....	....	....

"A."—Ratios and

Mortality of Newark from all

	1859.	1860.	1861.	1863.	1864.	1866.
Ratio of Deaths from all Causes per 1,000 (to pop)	25 7	30 2	24 5	28 7	30 7	24 7
Rate per 100 of Deaths from Zymotic Disease (as tabulated at City Hall) to Total Deaths	11 6	16 8	11 8	12 3	17	13 2
Rate per 100 for all Preventable Disease correctly tabulated according to formulæ of National Board of Health	48 7	53 4	53 8	51 1	53 1	53 3
Rate per 100 for Respiratory Disease	25 6	23 2	26 4	27 5	24	25
Rate per 100 for Disease of Brain and Nervous System	22 9	21 1	21	22 1	20	18
Rate per 100 for Genito-Urinary	0 5	0 6	0 4	0 4	0 8	0 2
Rate per 100 for External Causes	4 3	3	3 5	3 8	3	3
Rate per 100 for Mothers and Infants	14	13	14 8	14 7	11 4	18 9
Rate per 100 for Uncertain Seat, Integumentary, etc	9 4	9 2	10	9 7	10	11
Rate per 100 for Circulatory	3 7	3 2	2 8	3 8	3 7	3 7
Rate per 100 for Digestive	8 5	8 7	8 1	7 6	8 3	7

Mortality.

1.—*ante.*)

1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.
6	....	1	2	3	5	13	13	11	10	3	....
14	....	34	26	9	21	34	30	22	49	59	49
....	....	1	2	....	1	....	2	....	....	1	4
9	....	3	7	9	8	11	9	15	31	12	5
1	....	4	7	2	2	4	2	2	5	1	....
1	....	2	4	3	1	1	6	2	1	....	....
4	....	2	5	14	7	5	12	11	8	8	8
....	....	1	1	1	2	....	1	1	....	....	1
4	....	7	5	5	3	4	7	1	1	3	5
3	....	2	2	8	19	15	10	14	20	14	18
6	....	2	3	2	4	6	5	4	5	5	3
3	....	2	1	1	3	5	1	8	7	10	36
2	....	....	....	4	3	3	3	2	5	....	2
97	....	108	131	121	162	141	139	86	98	109	88
1	....	....	....	....	....	....	....	....	....	2	1

Percentages.

Diseases, from 1859 to 1879.

1867.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
21	20 1	23 1	23 9	32 6	31 6	27 8	27 1	30	27 1	25 3	24
09 6	12 1	10 1	10 8	18 9	22 6	15 1	16 6	17 7	16 6	13 7	....
50 8	53 9	56	51	57	56 8	56	56	56 9	55	54 6	....
24 2	24	26 9	24 5	21 4	21 8	26 4	25 9	22 8	22	27 3	....
20 7	19 3	18 8	18 7	20	18 4	18 1	16 6	18 8	17 4	18 1	....
1	07	1 1	1 1	1 1	09	1 5	1 8	1 3	1 6	1 7	....
3 3	3 1	4 2	4	3 9	3 4	3 4	3	4 4	4 6	3 5	....
17 5	17 1	18 4	17 1	15 5	15 3	14 3	13	10 9	8 8	9 8	....
11	11	12	10	9	7 1	9 8	12	13	18	14	....
4 3	3 4	4 4	4 5	3 4	3 6	3 6	4 5	3 7	3 7	4 2	....
7 1	7 4	7 9	6 2	6 4	6 5	7 1	5 3	6 5	6 8	7	....

The first of the series shows the diseases which a recent classification of the National Board of Health group together as preventable, and, as will be seen, these have been selected from the different groups which follow, in order to show the relative prevalence of these in the city. These, which will be frequently alluded to in this investigation, are: *Diarrhœal Diseases, Diphtheria, Erysipelas, Cerebro-Spinal or Spotted Typhoid, Puerperal, Remittent, True Malarial, Scarlet and Yellow Fevers, Acute and Chronic Lung Diseases, Measles, Small-pox, and Whooping Cough.*

The ratios of death from each class to the total number of deaths, as also the ratio to population of death from all causes, are given in table "A."

Charts "B" and "C" show at once to the eye the range that the different diseases have had in the different years, the columns at the left indicating percentages of total deaths; that at the top, the year.

Chart "C" is important. Here is shown clearly the mortality as it ought to be and as it has been. Not once in ten years has it been as low as it should and as it would be but for removable cause.

Thirty and thirty-two per thousand are dangerous altitudes for a city's mortality, and always show a culpable disregard of the public welfare on the part of a city's rulers. There is no need of a greater mortality than twenty, and in favorable years fifteen, sixteen, or seventeen.

St. Louis, situated as we are, in a river valley, gives a record more frequently under even the latter figures than over them.

As will be seen, it has been from 1872 to 1876 that our mortality had attained an alarming proportion, and by the following chart ("D") the prevalence of preventable diseases justifies the above remark concerning culpability.

By the latter chart an interesting fact may be observed—that lung diseases, affections of the brain and nervous system, and malarial and zymotic diseases, bear a proper relation to each other.

From these charts ("B" and "C") it will be seen that the most unfavorable mortality recorded was in 1872, the next in 1864, and the next in 1876, since which date improvement has been steady and marked.

Diseases of mothers and infants gave the greatest mortality in 1866 and 1870.

Following this chart is "D", showing the percentages of death from zymotic, respiratory, and nervous diseases, and a special calculation to exhibit the prevalence of actual preventable diseases, a list of which has been already given.

The latter is somewhat startling, as it shows that more than one-half of the mortality may be classed under this head, and that *the rate is not decreasing in due proportion to the rate of general decrease.*

From this particular table the inference has been drawn that, as it would be almost impossible to thoroughly investigate all the deaths for all the years, if we take the two in which the mortality from preventable causes was the greatest, viz., 1872 and 1876, we should obtain data possibly suggestive of the cause of excess. It was further argued that if these showed any proper comparison, valuable facts could be deduced for deeper investigation.

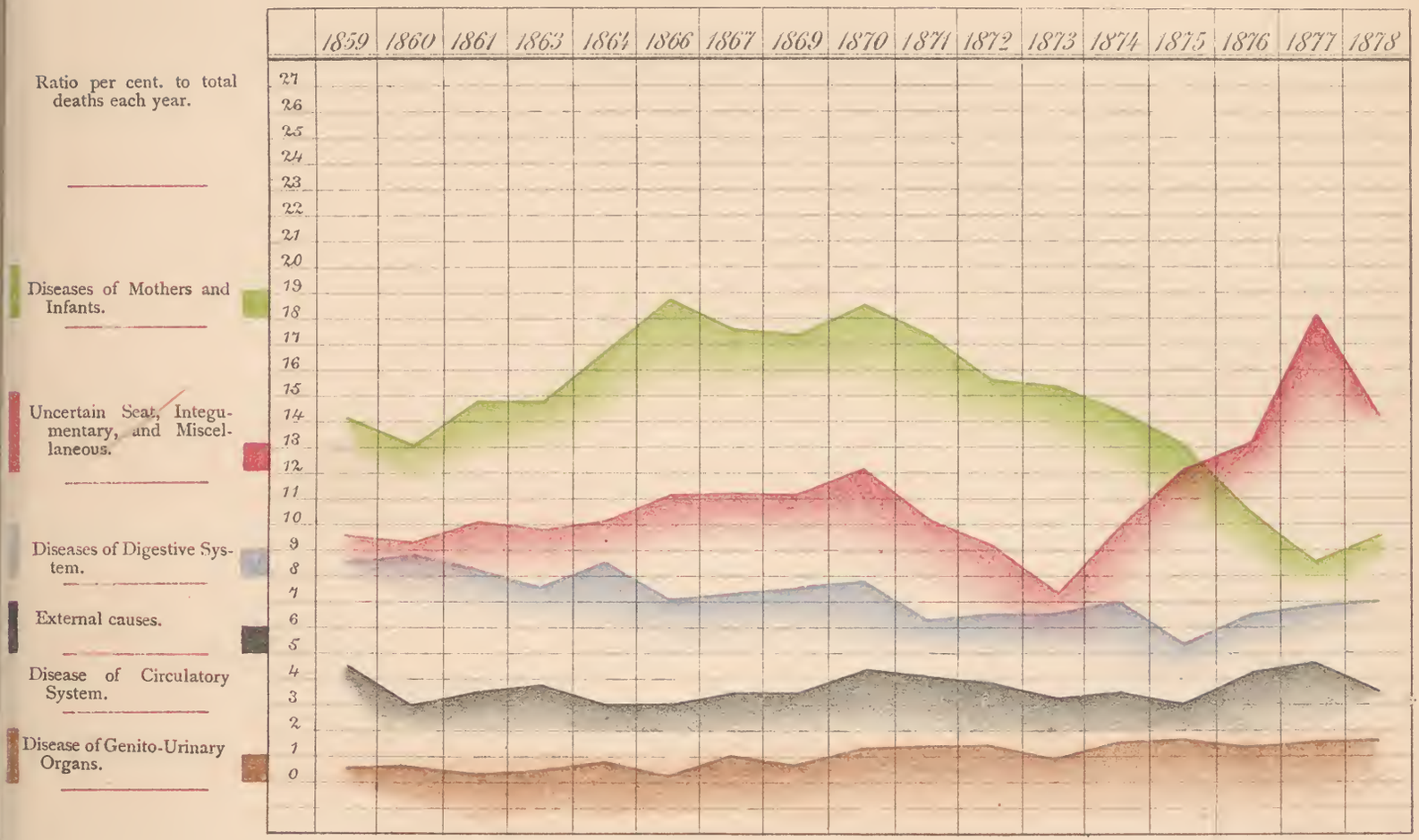
It will be observed that true zymotic diseases have not contributed unduly to the death-rate except in 1873, and that from 1867 to 1871 inclusive, this rate was favorably low.

Respiratory diseases and those of the brain and nervous system show a quite uniform rate, as it will be borne in mind that these are ratios to totals, and therefore comparable, the variations of population for the different years being taken into consideration. The former class is not excessive, and always and everywhere,

"B."—I.

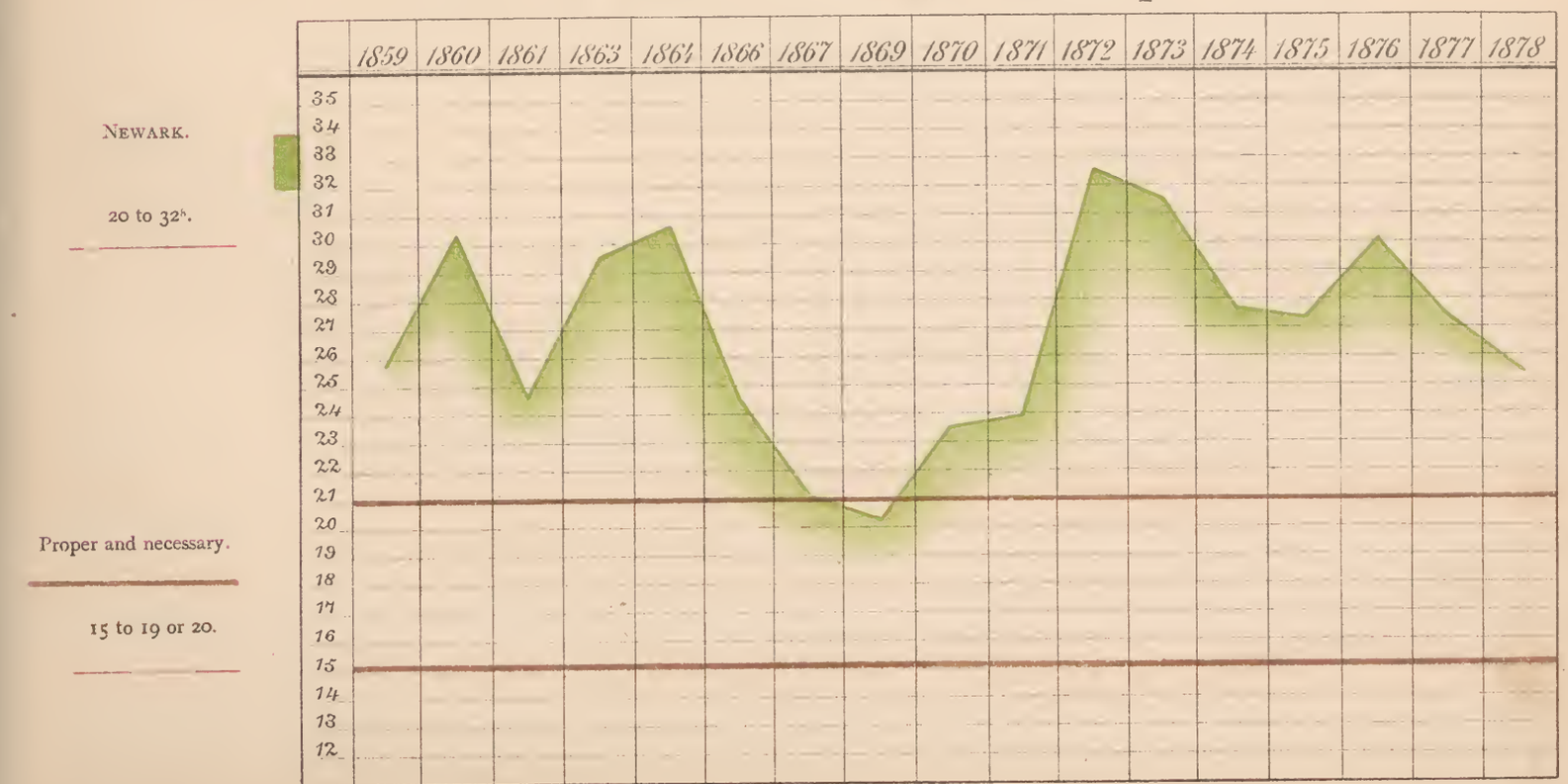
Mortality of the City of Newark.

DISEASES OF MOTHERS AND INFANTS—UNCERTAIN SEAT, INTEGUMENTARY, AND MISCELLANEOUS—DISEASE OF THE DIGESTIVE SYSTEM—DISEASE OF THE CIRCULATORY SYSTEM—DISEASE OF GENITO-URINARY ORGANS—EXTERNAL CAUSES.



"C."—II.

Ratio of Deaths from all Causes per 1,000.

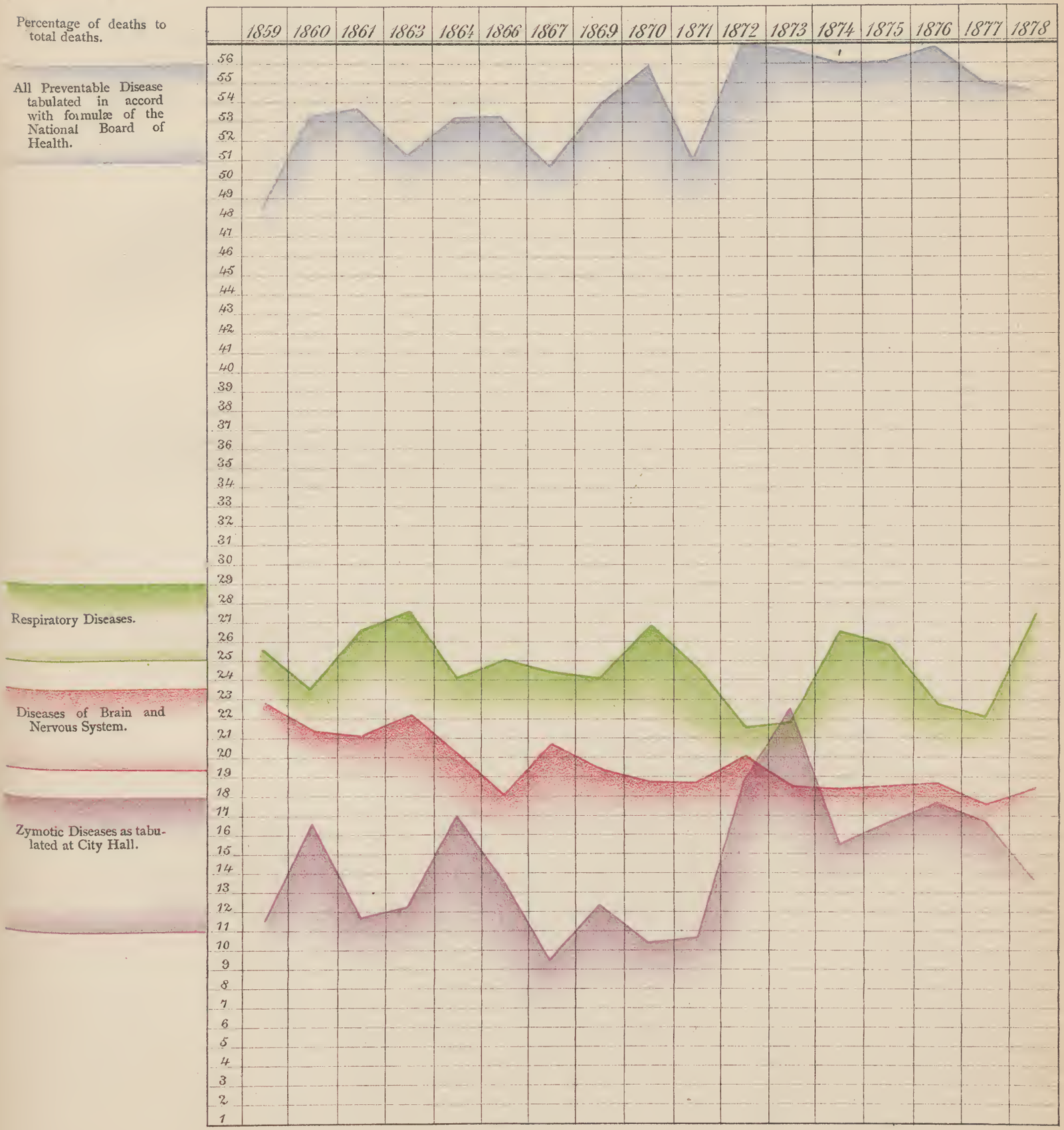


"D."—III.

Table showing the Percentage of Deaths from Zymotic, Preventable and Respiratory,

TOGETHER WITH NERVOUS DISEASES,

IN THE CITY OF NEWARK, 1859 TO 1879.



except in especially favorable localities throughout the United States, is above most others; consumption particularly carrying off an alarming proportion.

It may, in connection with this part of the subject, be remarked that the latter disease, being favored by clayey and alluvial soils, and usually by the dampness of river valleys and low altitudes, will be found here as elsewhere; but, although catarrhal and bronchial difficulties may be said to be quite frequent, the development of the deeper and fatal diseases is not as frequent as would be inferred. Much of the soil of Newark is porous, gravelly, or rocky, and it is not improbable that an excess of tuberculous and scrofulous consumption is thus rendered less likely to occur.

Table "E" is one that cannot but interest every one who has a family, for which the word diphtheria is one of terror. Beginning in 1860, at the low rate of 5 to 1000, it increased steadily till 1863, then paused, and again advanced in 1866, to fall again till 1871; then with rapid strides it ran up to 44 per thousand, paused a little in the following year, and then shot upward in 1875, and reached the alarming figures 111 per thousand, yielding a mortality *almost* in numbers as great as that of yellow fever in Memphis during the last epidemic. Two years this scourge prevailed, and then decreased in virulence almost as rapidly as it had advanced, dropping in 1878 to about 30 per thousand. During the past year it has been still less, and being, as it is almost everywhere conceded to be, the product of defective drainage and the exhalation from overcrowding and uncleanness, we may hope that it will yet be made to disappear.

The lines for malarial diseases will also prove of interest, and it is possible that a connection may be found between gradings, excavations, or sewer constructions, or perhaps sewer defects in the years of prevalence.

The line for small-pox indicates its disappearance from the city after almost an epidemic in 1872 and '73, and it may be an interesting fact that this loathsome disease has shown a remarkable declension throughout the United States during the past year, and it has been authoritatively stated that for a period of several weeks during the past autumn not a case occurred in one hundred of the principal cities, although it had prevailed almost as an epidemic in Canada.

In pursuance of a preconceived plan of investigation, and to search for the localities of disease, and thus ascertain in what direction to look for its source, another series of tables has been prepared.

The first (table "F") will present some features calculated to excite surprise. Starting with the very prevalent belief that the meadows have been a source of disease, and that the several open sewers, with their reeking filth allowed to stagnate in the sluggish streams into which they had been opened, must produce an undue mortality, it is almost suggestive of error of calculation that the Fourteenth Ward particularly should show so favorable a record. The figures themselves are, therefore, given. As will be seen, the mortality recorded is of *preventable diseases*, and not the ratios of death from *all* diseases; but as these include all that can be possibly connected with surroundings, the record is all that can be desired.

Please observe that the table is one for *two years only*, as heretofore stated, and these *the years of greatest mortality from preventable diseases.*

In order to present the clearest method of comparison at a glance, each death is represented by five millimeters, and the two years are contrasted by the different colors.

Every effort has been made to secure accuracy, both of calculation and measurement, and I believe that in spite of the unexpected result they are correct.

With reference to the population of the wards it should be stated that this was determined in the only way that seemed possible, viz., by calculations based on the official census of 1870 and that of 1875 (ward changes having occurred in the winter of 1871 and 1872), and for these calculations, as well as for much valuable information, I am indebted to Ex-Alderman J. C. Ludlow.

Table "G" gives in figures the ratios for the different forms of preventable disease, in order to ascertain if possible in which wards certain forms prevailed, and these figures are, further on, in tables "H" to "N", reduced to lines, so that they may appeal to the eye for comparison, and each death per 1,000 is represented by two centimeters of length. Diarrhœal diseases, largely occurring among infants and young children, afford the first apparent clue to the general death rate, for these are almost always connected with impure air, defective sanitary surroundings, *bad water*, filth, overcrowding, and neglect.

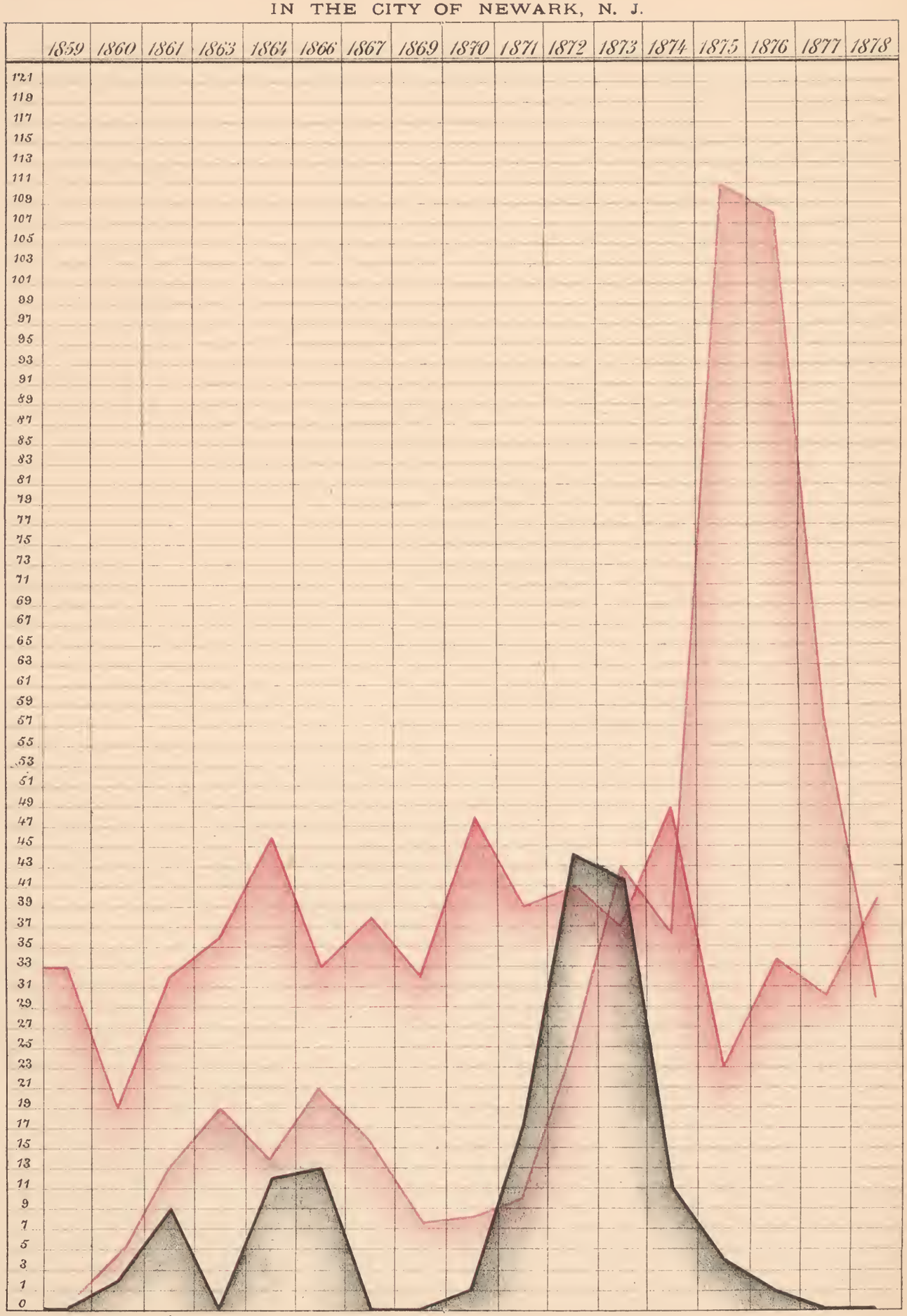
Of one of these in particular, viz., water, it may seem superfluous to speak. Every one has long ago been personally convinced that the aqueduct supply has been impure, and the improvement that has grown out of so general a conviction, through the efforts of the Aqueduct Board, and the driven wells, *may* possibly account for the great reduction in the past year's mortality. Whatever the new system may bring forth, certain it is that the public weal demands and will yet force to a consummation some plan for a purer supply. In this connection it may be stated that the city wells, of which there are many, are often sources of poison to an extent that is not widely known. I have made and caused to be made analyses of a considerable number, and have always found impurity, and often to a serious extent. More thorough and careful investigation into this matter has, however, been made by Dr. Lott Southard of this city, and was by him presented in an able address before the County Medical Society in 1878, and afterwards published in pamphlet form. To this public attention should be more widely directed. The washings from the streets, gutters and sewers quite frequently find their way through the soil, and a most constant source may be found in the dip of the rock strata through which the water finds its way from its original source to the wells, these strata being tapped where they approach the surface by cesspools, or privies a few feet in depth, while the wells at a long distance away strike the same strata at forty, fifty, or sixty feet. It is probably safe to assume that not one well in twenty yields a perfectly safe water, and the city, by an analysis of every one, and the closing of the worst, would show an economy that the future would well repay.

How far this water question is responsible for the extra mortality it is not my province to determine, but it might long ago by proper investigation have been ascertained. The reform which the public has called for, and must and will have, will, however, probably show it, without an expensive inquiry, within a few years by an improved mortality, or, if it is postponed, by fatal epidemics.

One emphatic note may, with propriety, be here made. Look at the final table of this series ("O"). *The predominance of diarrhœal disease means a common cause too evident to be overlooked. The different elevations of the different wards above the river, the different surroundings in each, the fact that the neighborhood of the meadows has no influence, shut out all other causes, and leave but one that can be considered common, viz., water.* Surely no further comment need be made.

Diphtheria, Malarial Diseases Proper, and Small-Pox,

IN THE CITY OF NEWARK, N. J.



Rates per 1,000 of deaths from Diphtheria to total deaths for each year *in purple lines.*

MALARIAL.
Intermittent, Remittent, Typhoid, Bilious, Congestive, and Dysentery *in red lines.*

Small-pox *in black lines.*

Diphtheria shown in purple lines.
Malarial Diseases proper in red lines.
Small-pox in black lines— heavy.

"F."

V.

Table showing the Relative Prevalence of Preventable Disease,

And consequently the Healthfulness of Different Wards for the years of greatest mortality, 1872 and 1876.

See also Table "D" for General Comparison.

RATIO OF DEATHS FROM PREVENTABLE DISEASES DURING 1872 AND 1876 IN DIFFERENT WARDS ACCORDING TO POPULATION IN THOSE YEARS.

Ratio per 1,000 of population. 5 millimeters to each death per 1,000.

			Deaths.	Ratio.
1st Ward	Pop. 1872	8,154	83	10 1
	" 1876	7,000	72	10 2
2d Ward.	" 1872	7,709	99	10 2
	" 1876	8,010	101	12 6
3d Ward.	" 1872	5,560	84	15 1
	" 1876	5,771	77	13 3
4th Ward.	" 1872	6,071	91	14 9
	" 1876	6,216	82	13 1
5th Ward.	" 1872	4,700	82	17 4
	" 1876	4,920	78	15 8
6th Ward.	" 1872	12,270	173	14
	" 1876	13,894	161	11 6
7th Ward.	" 1872	7,779	152	19 5
	" 1876	8,141	133	16 3
8th Ward	" 1872	8,914	119	13 3
	" 1876	10,343	128	12 3
9th Ward	" 1872	5,867	57	9 7
	" 1876	6,194	70	11 3
10th Ward	" 1872	10,010	130	12 9
	" 1876	10,652	119	11 1
11th Ward.	" 1872	3,990	63	15 8
	" 1876	5,080	69	13 5
12th Ward.	" 1872	10,189	236	23 1
	" 1876	11,858	192	16 1
13th Ward	" 1872	14,861	283	19
	" 1876	15,713	238	15 1
14th Ward.	" 1872	2,861	31	10 8
	" 1876	3,173	34	10 7
15th Ward	" 1872	6,065	83	13 6
	" 1876	6.347	129	20 3

The question of *density* of population is not indicated. The 2d, 9th, and 15th alone show increase.

"G."—Ratios of Deaths from the Different Preventable Diseases

To the Population of each Ward for 1872 and 1876 (latter in red).

	1st Ward.	2d Ward.	3d Ward.	4th Ward.	5th Ward.	6th Ward.	7th Ward.	8th Ward.	9th Ward.	10th Ward.	11th Ward.	12th Ward.	13th Ward.	14th Ward.	15th Ward.
Diarrhœa, Cholera Infantum, Cholera Morbus, Marasmus, Dysentery	2.	2.2	4.7	3.4	4.4	5.	5.	3.2	1.3	3.2	4.4	6.8	6.5	2.	4.2
	1.	1.6	2.2	1.7	3.04	2.2	2.5	1.6	1.6	1.4	2.3	4.2	3.1	1.2	2.2
Diphtheria	0.7	0.3	0.17	0.49	1.26	0.64	1.56	1.21	0.8	0.2	1.20	0.29	0.6	0.	0.65
	2.4	2.7	1.9	1.28	2.64	2.83	4.91	3.86	1.6	1.7	2.55	2.52	3.3	1.5	5.64
Erysipelas	0.3	0.3	0.	0.3	0.	0.24	0.12	0.11	0.	0.19	0.	0.	0.13	0.	0.32
	0.	0.	0.7	0.	0.2	0.07	0.	0.	0.16	0.28	0	0.	0.12	0.3	0.
Fever—Spotted	0.12	0.2	0.35	0.6	0.4	c.8	0.8	1.43	0.51	0.19	0.74	0.68	0.4	1.04	1.74
	..	..	..	..	..	..	..	0.09	..	..	0.19	..	..	..	..
Typhoid	0.7	0.5	0.53	0.3	0.21	0.24	0.6	0.44	0.68	0.49	0.49	0.19	0.46	0.69	0.49
	0.2	0.4	0.3	0.6	0.4	0.50	0.85	0.38	0.64	0.27	0.19	0.42	0.25	0.31	0.62
Puerperal	0.	0.	0.35	0.	0.	0.	0.	0.	0	0.	0.24	0.09	0.06	0.	0.16
	0.14	..	0.17	..	0.2	0.07	..	0.09	.	..	0.19	..	..	..	..
Remitting	0.	0.	0.	0.16	0.	0.	0.	0.11	0.	0.	0.	0.	0.	0.	0.
	..	..	..	..	..	.	..	..	..	.	..	0.08	..	..	..
Bilious and Other Malarial	0.3	0.13	0.17	0.49	0.21	0.32	0.12	0.22	..	0.09	0.49	0.39	0.06	..	0.65
	0.4	0.25	0.17	0.64	0.60	0.07	..	0.27	..	0.09	0.39	0.33	0.25	0.62	0.15
Typhus	..	0.1	0.17	0.16	..	0.16	..	0.11	..	0.09	0.24	0.09	0.13	..	..
Scarlet	0.7	0.39	0.89	0.99	1.47	0.40	0.48	0.22	..	0.39	0.98	0.78	1.20	0.69	0.98
Yellow	..	0.49	0.86	0.96	0.80	0.50	1.34	0.09	0.64	0.46	1.18	0.72	0.50	0.31	1.10
Lung Disease (Acute) Bronchitis and Catarrh	3.	3.7	2.14	1.98	3.15	2.	2.64	1.98	1.70	3.2	1.69	4.80	1.84	0.34	1.96
	2.	2.74	2.07	3.68	3.45	1.70	1.84	1.64	2.73	2.66	2.94	3.86	2.92	.	2.82
Lung Dis'e (Chronic) Phthisis Hæmoptysis	0.8	2.4	2.68	2.31	3.36	1.44	3.36	3.08	2.5	2.87	3.60	2.45	2.61	4.18	1.14
	1.86	1.87	2.76	2.08	3.45	2.01	2.45	1.73	1.61	2.39	1.97	1.93	1.65	..	2.82
Measles	..	..	..	0.33	..	0.08	..	..	..	..	..	0.09	0.06	0.34	0.16
	..	..	..	0.16	..	..	..	..	..	..	..	0.08	..	..	..
Small-pox	0.3	1.3	1.43	2.14	1.26	1.78	1.92	0.33	0.34	0.79	0.74	3.82	3.35	..	0.65
	..	..	..	..	..	..	..	..	..	..	..	0.33	..	..	..
Whooping Cough	..	0.13	0.53	..	..	0.24	0.12	..	0.17	0.19	..	0.88	0.33	0.34	0.32
	0.14	..	0.34	..	0.20	..	0.24	..	0.16	0.09	..	0.08	..	..	0.15
Debility, Weakness, Asthenia, Exhaustion, Inanition, Adynamia, Exposure	0.6	0.7	0.89	1.15	1.47	0.64	1.44	0.66	1.53	0.69	0.49	1.57	1.20	1.04	0.65
	2.	2.36	2.41	1.92	1.	1.56	2.08	2.51	2.09	1.40	1.56	1.44	2.92	1.57	2.97

"H."

1872 and 1876.

PREVENTABLE DISEASES BY WARDS.

Ratio to Population,
One to each 1,000 represented by 2 centimeters.

1872 in Red Lines.
1876 in Black.

Nos.
VI, VII, VIII, IX, X, and XI.

1872 IN RED LINES.
1876 IN BLACK.

1872 and 1876.

"H."—Diarrhœal Diseases

By Wards.

Ratio per 1,000 of population (2 centimeters per death).

Centimeters and Millimeters.

"I."—Diphtheria

By Wards in 1872 and 1876 (the latter the year of prevalence). 2 Centim.

RED LINES, 1872.
BLACK " 1876.

"J."—Fevers, 1872 and 1876.

Ratio to population, 2 centimeters to 1 death per 1,000 inhabitants.

"K."

Same years and measurements.

1872 IN RED LINES.
1876 IN BLACK.

"L."—Disease of the Lungs.

2 centimeters per 1 death per 1,000 population.

"M."—Whooping Cough.

Whooping Cough has produced so few deaths as not to repay for tabulation. The actual proportions, however, to population in each ward are given for reference:

1st Ward	in 1872	0		In 1876	1 4	to 10,000
2d "	"	1 3	to 10,000	"	0	"
3d "	"	5 3	"	"	3 4	"
4th "	"	0		"	0	"
5th "	"	0		"	2	"
6th "	"	2 4	to 10,000	"	0	"
7th "	"	1 2	"	"	2 4	"
8th "	"	0	"	"	0	"
9th "	"	1 7	"	"	1 6	"
10th "	"	1 9	"	"	0 9	"
11th "	"	0	"	"	0	"
12th "	"	8 8	"	"	0 8	"
13th "	"	3 3	"	"	0	"
14th "	"	3 4	"	"	0	"
15th "	"	3 2	"	"	1 5	"

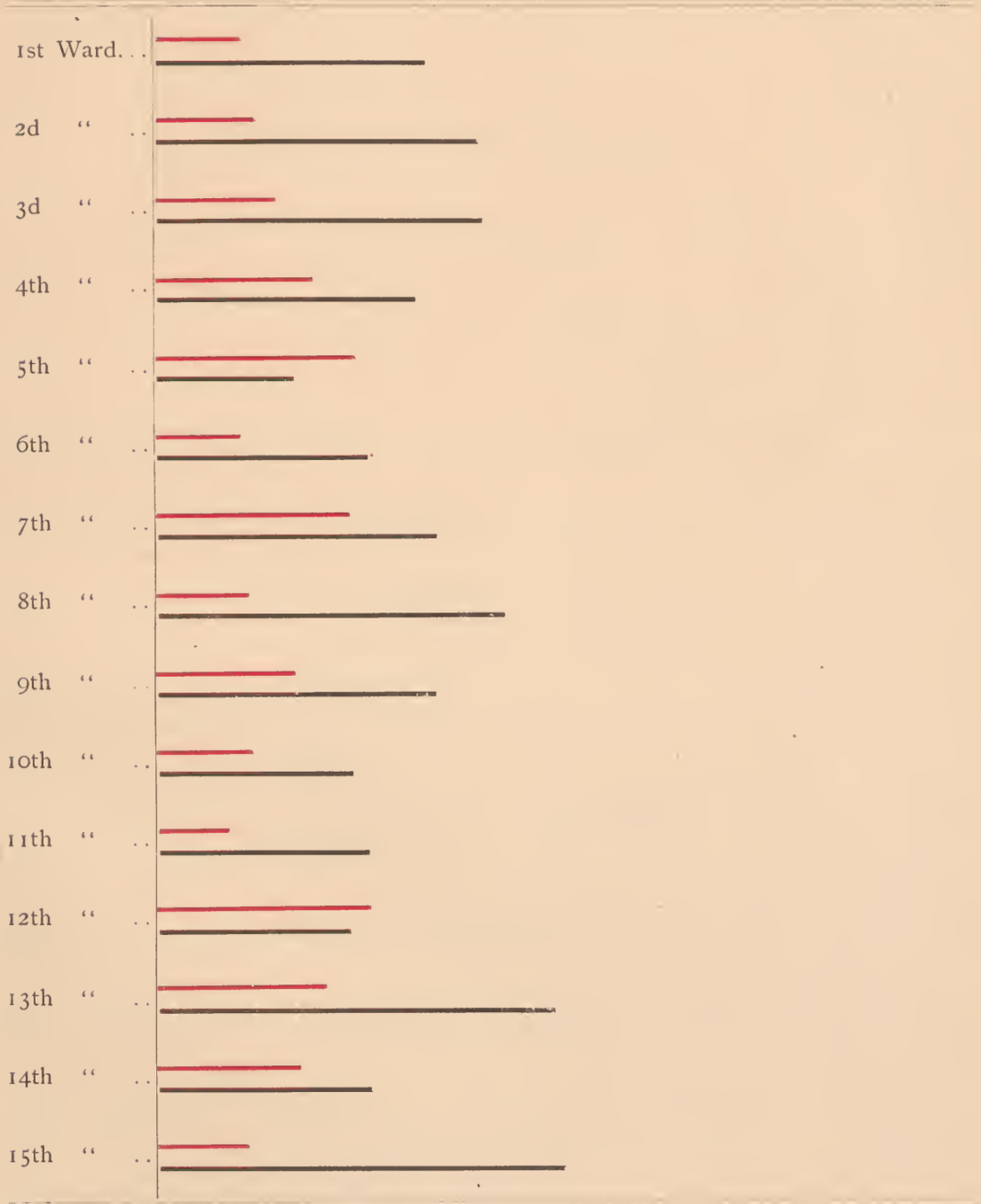
This disease, therefore, shows more in 1872 in the 12th and 3d Wards, and in 1876 in the 3d Ward, although the disease is, as will be seen, fatal only to a very slight degree in this city.

"N."

1872 and 1876.

Debility, Weakness, Asthenia, Adynamia, Exhaustion, etc.

Ratio per 1,000 of population, 2 centimeters.

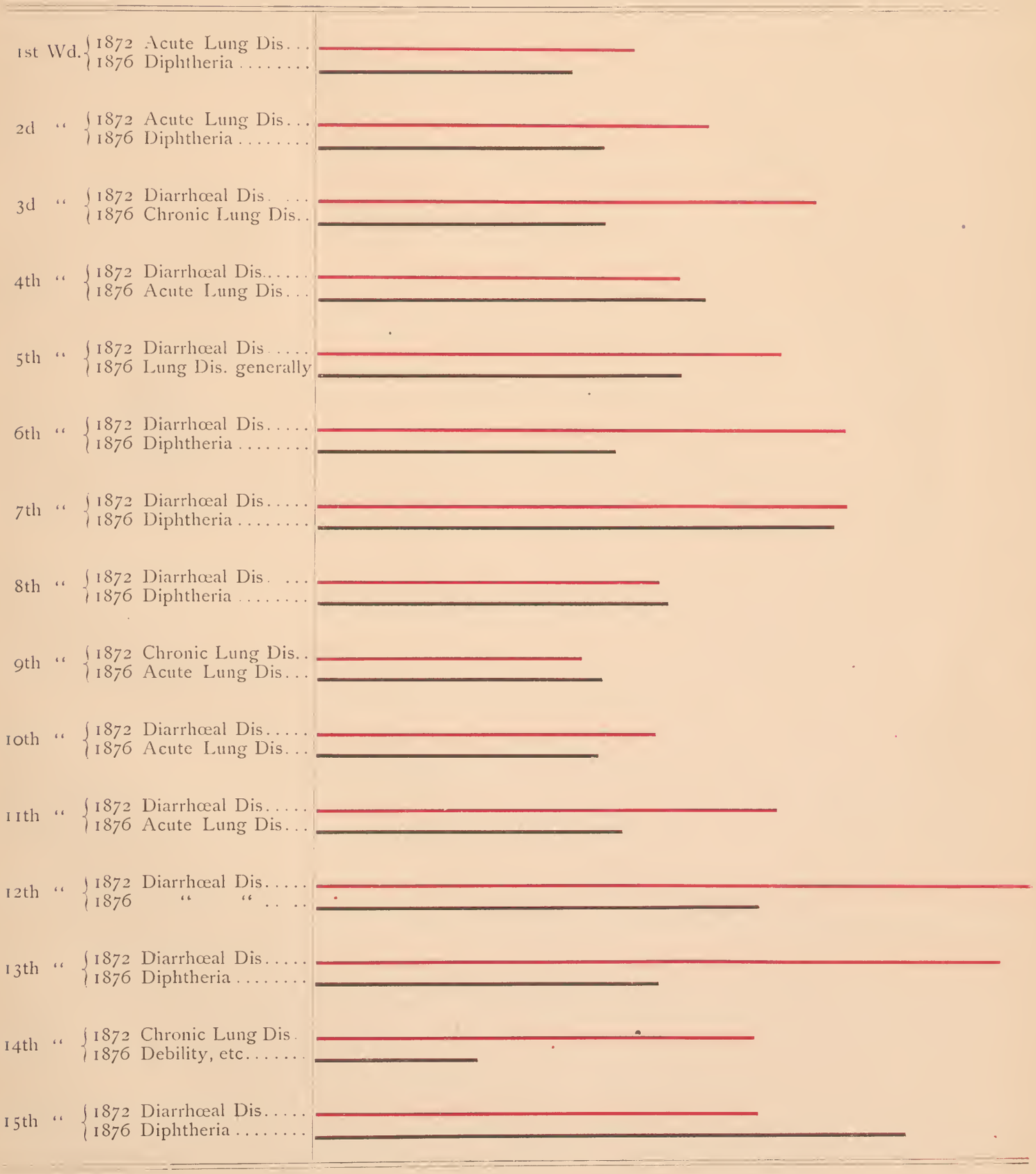


"O."

Preventable Diseases most prevalent in the different Wards in 1872 and 1876.

1872 in red ; 1876 in black.

2 centimeters, 1 death per 1,000 inhabitants.



For remarks upon the above table, see note of emphasis on page 20.

Comparison between diarrhœal diseases and diphtheria may, with interest, be made with those commonly supposed to be dangerous and prevalent, viz., Typhoid, Malarial and Scarlet Fevers. The lines are all drawn on the same scale and with accurate care. Those of the latter diseases sink into insignificance beside the two former, and seem hardly worth the labor of compilation and measurement.

As will be seen, cerebro-spinal meningitis and typhus fever both prevailed in 1872 and seem to have disappeared in 1876.

Scarlet fever appears to have been more fatal in the former year than in the latter, while typhoid averages about the same.

Diseases of the lungs, both acute and chronic, gave worse relative mortality in 1872 than in 1876, and the record of the Fourteenth Ward appears in this respect incredible. The great change from the former to the latter years is to me unaccountable.

The uniformity in the Fifth Ward is also noticeable. Table "N" shows an apparently startling increase in death from the sources enumerated. It is, however, of no practical value beyond showing the general carelessness of death returns, the terms used being frequently the cover for ignorance and uncertain diagnosis. A large proportion, however, of these deaths occurred at quite an early age—that is, among infants.

Not satisfied with the results of the investigations thus far, it seemed probable that a localization of the deaths during the years under special study might lead to some opinion as to the evil sought, and elaborate tables were accordingly prepared, showing the streets and numbers where the deaths from preventable diseases had occurred. These it is not necessary to give ; but, prepared with a very great expenditure of time and patience, they were transferred by the City Surveyor to maps, and these maps are herewith presented. Each death was then marked as a black line across the street, and, when completed, struck the eye at once, and seemed to show a sort of segregation in certain localities. That this was not imaginary I was convinced by striking circles of given area from centres in these localities. The area of these, as will be seen, varies from 440 yards to 880 yards. This was done on the map for 1872, and then precisely the same circles from the same centres were struck on the map for 1876. It is certainly interesting and surprising that these show the same centres of segregation and the eleven circles include the very large bulk of all the deaths. Here was a coincidence that could not possibly under the doctrine of probabilities be accidental. The reason for it is not apparent, and probably cannot be determined without special investigation. It does not appear to be connected with mere density of population.

A careful study of the localities of these deaths may give some clue to the causes which prevail, especially when taken in connection with the preceding tables, in which the different diseases are localized by wards.

One feature will be at once apparent—the deaths in 1876 are more scattered than in 1872, and although the two years compare very closely in relative numbers, there is clearly improvement indicated in their diffusedness in the latter. The numbers in the circumscribed areas will show this. Thus, in map "A" the circle 586 yards in diameter, between Hamburg place and St. Francis street, gave in the former year 31 preventable deaths, and in 1876 but 17. The circle 440 yards in diameter, between Elizabeth, Merchant, and Clover streets, gave, in 1872, 36 deaths, and in 1876 but 25. The circle 880 yards in diameter, between

Ferry street and the river, gave 101 in 1872, and 67 in 1876, and the others as follows, a few only showing increase :

				1872.	1876.
Circle	880	yards, between	Garden, Madison, and Ferry streets	111	116
"	880	"	Jefferson, Garden, and Thomas streets	73	65
"	880	"	N. & N. Y. R. R. and the river	34	35
"	880	"	Pearl, Broad, and Warren streets	99	102
"	880	"	High, Bedford, Montgomery streets and S. O. avenue	239	161
"	880	"	High, Bank, Wallace place and Sussex avenue	137	113
"	586	"	Bank, Central avenue, Norfolk and Fairmount avenues	35	50
"	880	"	Orange, Broad, Nesbit, and Sixth avenues	108	118

From the location and direction of the sewers, the change wrought by their introduction seems to be favorable rather than, as many have asserted, unfavorable. Indeed, my own conviction prior to this investigation was, that the sewers were a source of increased mortality, a conviction which does not appear to be justified by facts. The canal, too, which is but too truly an open sewer, would, according to theory, seem a source of disease, does not show such an assemblage of black marks in its vicinity as to warrant present apprehension, although it needs no argument to show the danger of its too frequent use as a drain for the population along its banks.

Whether or not the sewers are at fault as a cause of the undue mortality, one other thing suggested itself, viz., the character of the soil and the covering up of old water courses and marshy lands.

To determine the influence of these, map " C " has been prepared, which shows in different colors the old streams and ponds, and the portions filled in at different times, and the depth of the filling.

On this map were struck the circles of the same area and centre as before, and the connection of these the reader can determine, bearing in mind the relative density of population in the districts thus made inhabitable. To my own mind there is a connection, but only investigation by the city authorities into the character and perfection of the drainage can definitely decide its importance.

In summing up the results of this investigation, I have been struck by the fact that theories, however plausible on the subject of a city's sanitary surroundings, are valueless against stubborn facts and figures.

Blind sewers and outlying meadows can hardly *add* to the salubrity of a city, but if the mortality in their immediate vicinity is less than in other places, those other places need the first attention.

Cleanliness of the streets and purity of the water supply, perfect drainage, and personal inspection of crowded localities where the poor congregate, will lift a city into a condition that cannot fail to make it a desirable place of residence ; and this can never be brought about till it is understood that accurate record, sanitary inspection, and intelligent and constant supervision are economical even at a lavish expense. No city can be said to be alive to its own interests in which it is impossible to ascertain the *sickness rate* in its different districts, from official record, and in Newark this cannot be even approximated.

With regard to the surprising results given regarding the different wards, remarks are superfluous, since the tables speak for themselves, and if they do not correspond with preconceived notions, they are none the less facts.

MAP "A,"

Showing the Locality of every Death from Preventable Disease in the Year 1872; showing, also, the state of the Sewers for that Year.

MAP "B,"

Showing the Locality of every Death from Preventable Disease in the Year 1876: showing, also, the state of the Sewers in that Year.

MAP "C,"

Showing the Made Land and the different Depths of Filling, and also the old Water-Courses.

It could not be expected that final results could be reached in such a work as is here presented, however much time or labor should be given, but enough has probably been presented to furnish an intelligible guide to deeper and authoritative search.

In conclusion may be well presented a map showing the elevation of different parts of the city above high-water mark.

The contour lines indicate, by the figures at the margin and at intervals on the lines themselves, the number of feet of elevation.

On the first page of this work it was remarked that Newark is healthfully situated, and this map shows it to occupy a spot that would be selected naturally for the site of a city. Facing east, southeast and south, on a river side, with a slope of gradual ascent toward the west, and at some points rising to a height of over two hundred feet, there would seem to be no reason why anything should interfere with its salubrity save willful neglect, ignorance or apathy on the part of its inhabitants.

The map is one that will bear careful study, and will be of interest.

Respectfully submitted,

EDGAR HOLDEN.

NOTE.—The year just closed (1879) has rendered an improved mortality, viz., 24 per 1,000; but, as heretofore stated, even this is far too high. See Chart "C."

MAP "D,"

Showing the elevation of different parts of the City above high water line.